TEACHERS' RETIREMENT SYSTEM

STATE OF MONTANA

ACTUARIAL VALUATION

AS OF JULY 1, 1979

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SECTION I

INTRODUCTION

An actuarial valuation of the Teachers' Retirement System of the State of Montana has been completed as of July 1, 1979. This valuation was authorized by the Teachers' Retirement Board under Section 19-4-201, M.R.C. The purpose of the valuation was to determine the financial position of the fund, the normal cost, and the unfunded accrued liability based upon present and prospective assets and liabilities of the system as of July 1, 1979.

Section II presents an analysis of the results of the actuarial valuation. The numerical findings supporting this analysis are shown in Section III.

In conducting the actuarial valuation, certain assumptions were made as to the future experience of the system. A summary and discussion of each of the assumptions is contained in Section IV.

The valuation is based upon the Teachers' Retirement Act and incorporates all amendments as of July 1, 1979. Employee data and other records supplied by the system are summarized by classification in Sections V and VI. A summary of the major provisions of the Act is contained in Section VII.

ACTUARIAL CERTIFICATION

Based upon the assumptions stated in this report and the employee data and other records provided by the Teachers' Retirement System, the actuarial valuation contained in this report has been performed in accordance with generally accepted actuarial principles and techniques.

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SECTION II

ANALYSIS OF VALUATION

As a result of the valuation which was conducted as of July 1, 1979, we have concluded that the Montana Teachers' Retirement System is funded on an actuarially sound basis. The present contribution rate of 12.499% of salaries is sufficient to finance the cost of the benefits as they accrue in the future as well as to amortize the current unfunded liability over a period of 48.15 years. If the unfunded liability is to be funded over the recommended period of forty years, the required contribution would be 13.089% for an increase of .59%.

The current amortization period of the unfunded liability has increased 4.40 years since July 1, 1977. Several factors contributed to this increase. The most significant factor is severance pay. Teaching contracts are frequently including severance pay as an addition to compensation during the final year of employment. This additional compensation increases the average monthly salary used in determining retirement benefits.

Severance pay had played a minor role in the overall cost of the system prior to 1977. Since that date, the number of school districts allowing severance pay as part of the contract has increased significantly and, as of July 1, 1979, 45% of the retiring members were granted additional benefits as a result of this pay. The actuarial adjustment for the projected increase in future benefits has increased the amortization period by 6 1/3 years.

A second factor which increased the cost of the system as a percentage of salary is the decrease in membership. On July 1, 1977, the number of active members was 15,429. This number has decreased to 15,122 as of July 1, 1979. The result is a slight increase in the average age of the membership as well as the average years of accrued service. This change tends to increase the average liability and decrease the future funding period. It should be emphasized that the result of this membership decrease is an increase in the percentage of salary required, not the dollar amount of contribution required.

In conducting this actuarial valuation, changes were made in the assumed rate of future investment earnings and the future salary increases as a result of cost-of-living adjustments. The assumed rate of investment earnings in the last several actuarial valuations has been 6¼%. Based upon economic projections of higher investment yields on a long-term basis, as well as the actual performance of the investments of the Teachers' Retirement fund, the assumed rate of future investment earnings was increased to 7%.

Future salary increases from cost-of-living adjustments were previously assumed to be 5% annually. Again, based upon economic projections of a higher long-term cost-of-living increase, the underlying rate of salary increases as a result of cost-of-living adjustments was changed to 5½% annually.

The net effect of the two changes in the actuarial assumptions noted above was a slight decrease in the amortization period required to finance the unfunded liability. The previous actuarial assumptions would have extended the amortization period an additional 2 years. It should be noted that the revised actuarial assumptions would have shown a decrease in the amortization period from the previous actuarial valuation had the financing of the severance pay not become a significant matter.

SECTION III

SCHEDULE A

NORMAL COST ALLOCATION

	Contribution Rate		
	Female	Male	Total
Retirement	6.148%	5.185%	5.605%
Death	.455	.856	.677
Disability	.312	.273	.290
Vested	1.154	1.017	1.076
Return of Contribution	.884	.604	.727
Total	8.953%	7.935%	8.375%

(1) Present Value of Future Salaries of Present Members $2,494,094,635

(2) Normal Cost Contribution Rate 8.375%

(3) Present Value of Future Normal Costs for Present Members ((1) x (2)) $ 208,880,426

SCHEDULE B

UNFUNDED ACCRUED LIABILITY ALLOCATION

(1)	Present Value of Benefits (Schedule C)	$ 739,207,759
(2)	Present Value of Future Normal Costs (Schedule A)	208,880,426
(3)	Trust Fund Assets	175,975,758
(4)	Unfunded Accrued Liability ((1)-(2)-(3))	$ 354,351,575

Amortization over 40-year Period

(5)	Present Value of Salaries of Members during next 40 Years	$7,516,569,132
(6)	Unfunded Accrued Liability Contribution Rate ((4) by (5))	4.714%
(7)	Normal Cost Contribution Rate (Schedule A)	8.375%
(8)	Required Contribution Rate	13.089%

Current Period of Amortization (48.15 Years)

(9)	Present Value of Salaries of Members during next 48.15 Years	$8,592,896,653
(10)	Unfunded Accrued Liability Contribution Rate ((4) by (9))	4.124%
(11)	Current Contribution Rate ((7) + (10))	12.499%

SCHEDULE C

ACTUARIAL BALANCE SHEET

Assets:			
(1)	Trust Fund	$175,975,758	
(2)	Present Value of Future Contributions for Unfunded Accrued Liability	354,351,575	
(3)	Present Value of Future Contributions for Normal Costs	208,880,426	
Total Assets			$739,207,759
Liabilities:			
(1)	Present Value of Benefits - Inactive Members		
	(a) Retirement	$139,604,423	
	(b) Death	9,648,917	
	(c) Disability	3,995,240	
	(d) Vested	4,847,817	
	(e) Dormant	1,404,250	
	(f) Tax Sheltered Annuity	995,392	
	(g) Excess Interest Payment	30,500	
			$160,526,539
(2)	Present Value of Benefits - Active Members		
	(a) Retirement	$419,059,337	
	(b) Death	44,318,374	
	(c) Disability	17,978,050	
	(d) Vested	67,905,892	
	(e) Return of Contributions	26,174,470	
	(f) Legacy Fund	30,426	
	(g) Tax Sheltered Annuity	3,214,671	
			$578,681,220
Total Liabilities			$739,207,759

SECTION IV

ACTUARIAL FUNDING METHOD AND ASSUMPTIONS

The true cost of the Teachers' Retirement System will be determined by its own future experience. In determining the financial requirement of a system, certain assumptions must be made as to the expected future experience. This section summarizes the funding method applied as well as the basic assumptions used.

Any variations in the actual experience of the system from those assumed in this valuation may cause changes in the projected future costs of the system. It is therefore necessary that the actuarial assumptions be reviewed from time to time with adjustments as experience warrants. It is also important that regular valuations be performed to determine the financial effect of variations between the actual and assumed experience.

The assumptions shown below were based upon the actual past experience of the system together with our projections as to future experience.

FUNDING METHOD

The method of funding employed is commonly referred to as the entry age normal cost method. This method establishes a normal cost of the system as well as an unfunded accrued liability. The normal cost is the level percentage of total salaries required to fund the benefits, assuming this percentage had been contributed since each member's entry into the system.

The unfunded accrued liability represents the excess of the present value of total liabilities over the present assets of the system and the present value of expected future contributions for normal costs.

In order to maintain the system on an actuarially sound basis, the total rate of contribution should be such as to meet the normal cost in addition to making progress towards the amortization of the unfunded accrued liability.

MORTALITY RATES

The mortality rates for males and females are based upon a published table referred to as the 1971 Group Annuity Mortality Table. The expected annual rates of mortality for selected ages are shown below:

Age	Female	Male
25	.035%	.062%
30	.047	.081
35	.065	.112
40	.094	.163
45	.140	.292
50	.215	.529
55	.326	.852
60	.549	1.312
65	.956	2.126
70	1.648	3.611
75	3.239	5.529
80	5.609	8.743
85	8.918	13.010
90	13.858	17.945

DISABILITY RATES

The disability rates for males and females are based upon the ordinary disability rates published by the Railroad Retirement Board in its eighth valuation. The expected annual rates of disability for selected ages are shown below:

Age	Annual Rate of Disability
25	.015%
30	.015
35	.020
40	.045
45	.095
50	.170
55	.310

WITHDRAWAL RATES

The withdrawal rates are based upon a recent study of the experience of the Teachers' Retirement System. Sample rates are shown below:

Age	Annual Rate of Withdrawal
25	18.1%
30	13.7
35	10.6
40	8.1
45	5.6
50	3.1
55	1.9

FUTURE SALARIES

The rates of future salary increases are based upon a recent study of longevity and meritorious increases by age. In addition to the base increases, an inflationary increase of 5½% per year is assumed. Sample rates are shown below for longevity and meritorious increases as well as total annual increases:

Age	Longevity and Meritorious	Total
20	3.90%	9.61%
25	3.40	9.09
30	3.00	8.67
35	2.10	7.72
40	1.10	6.66
45	.60	6.13
50	.50	6.03
55	.50	6.03
60	.50	6.03

RETIREMENT RATES

Based upon a recent study of the experience of the Teachers' Retirement System, retirements were assumed to occur at an average age of 62. The retirement age was appropriately adjusted for those members who had less than five years of service and for those who had already attained the average retirement age.

INVESTMENT EARNINGS

The annual rate of net return was assumed to be 7% for future investment earnings.

EXPENSES

The administrative expenses are assumed to be paid from investment income in excess of the assumed rate of 7%.

ASSETS

The security investments are valued at amortized book value. The real estate mortgages are valued at full principle value.

SECTION V

COMPARISON SUMMARY

	Fiscal Year Ended 1977	Fiscal Year Ended 1979
Present Value of Benefits	$650,534,903	$739,207,759
Present Value of Normal Costs	186,850,307	208,880,426
Unfunded Accrued Liability	320,710,602	354,351,575
Active Members		
Number of Lives	15,429	15,122
Annual Payroll	$227,689,613	$246,085,408
Inactive Members		
Number of Lives	4,146	4,529
Monthly Benfits	$ 1,283,827	$ 1,527,664
Contributions Based on Payroll		
Employer Share	$ 14,371,768	$ 15,532,911
Employee Share	$ 14,087,156	$ 15,225,304
Assets	$142,973,994	$175,975,758

SECTION VI

SUMMARY OF ACTIVE MEMBERS

Females

Nearest Age	No. Of Lives	Average Service at Ret.	Average Current Salary	Average Projected Benefit
- 24	686	39.45	$ 929.01	$7,231.03
25 - 29	2,060	37.64	1,057.65	5,932.47
30 - 34	1,524	35.79	1,189.78	4,494.66
35 - 39	1,004	32.31	1,318.45	3,100.39
40 - 44	723	29.10	1,354.53	2,078.40
45 - 49	575	26.40	1,393.96	1,446.22
50 - 54	486	24.27	1,446.79	1,034.64
55 - 59	399	23.47	1,466.24	740.43
60 - 64	287	22.75	1,443.29	603.18
65 -	35	22.69	1,295.39	537.49
	7,779			

Males

Nearest Age	No. Of Lives	Average Service at Ret.	Average Current Salary	Average Projected Benefit
- 24	251	39.23	$ 978.13	$7,455.95
25 - 29	1,341	37.39	1,111.05	6,187.25
30 - 34	1,605	35.74	1,313.68	4,832.59
35 - 39	1,346	33.83	1,592.25	3,850.24
40 - 44	962	31.86	1,762.70	2,924.13
45 - 49	788	30.61	1,855.53	2,204.77
50 - 54	537	30.15	1,862.09	1,634.21
55 - 59	359	30.02	2,042.53	1,340.97
60 - 64	139	27.50	2,000.11	998.46
65 -	15	29.07	2,309.95	1,203.91
	7,343			

SUMMARY OF INACTIVE MEMBERS

Form of Payment	No. Of Lives	Average Age	Average Benefit
Normal Retirement	3,710	68	$360
Early Retirement	240	60	287
Disability	138	67	257
Spouse's Benefit	386	64	213
Child's Benefit	55	14	100
Total	4,529	67	$337
Tax Sheltered Annuity	38	66	$ 91

VESTED AND NONVESTED MEMBERS

Active Members	No. Of Lives
Vested Members	8,696
Nonvested Members	6,426
Total Members	15,122
Inactive Members*	
Vested Members	5,252
Nonvested Members	2,334
Total Members	7,586

* Includes unclassified members.

SECTION VII

SUMMARY OF BENEFIT PROVISIONS

Vesting Period	5 years. No benefits are payable unless the member has a vested right.
Final Average Salary	Average of highest 3 consecutive years of earnings.
Normal Form of Benefits	Life only annuity. All benefits cease upon death; however, in no event will the member receive less than the amount of his personal contributions with interest.
Normal Retirement Benefits	Minimum of 30 years service or age 60; maximum of age 70. The retirement benefit is equal to one-sixtieth (1/60) of final average salary for each year of service. The minimum benefit is equal to one-sixtieth (1/60) of $4,800 for each year of service.
Early Retirement Benefits	Minimum age 55; the retirement benefit is calculated in the same manner as described for normal retirement, but the monthly benefit is reduced ½ of 1% for each month early retirement precedes age 60.
Death Benefits	The death benefit is equal to one-sixtieth (1/60) of final average salary for each year of service accrued at date of death with an actuarial adjustment based on the relation of the member's age at death to his beneficiary's age. In addition, a child's benefit of $100/month is paid to each child under the age 18 until he attains age 18.
Disability Benefits	The disability benefit is equal to one-sixtieth (1/60) of final average salary for each year of service accrued at date of disability. The minimum disability benefit is equal to one-quarter (¼) of the final average salary.

Withdrawal Benefits	With less than 5 years of service, the accumulated employee contributions with interest are returned. With more than 5 years, the member may elect a refund of contributions with interest, or may leave his contributions and retain a vested right to death and retirement benefits.
Tax Sheltered Annuity	The Teachers' Retirement System sponsors a tax-deferred annuity program for the benefit of its members. The policies of this program have been established in accordance with the guidelines set by the Internal Revenue Service. The benefits provided by this program are determined solely by the value of the member's account (voluntary contributions plus interest) using actuarial tables provided by the Retirement Board.